WHAT IS CLAIMED IS:

1. A method for transcoding a frequency transform-encoded digital video signal representing a sequence of video frames to produce a compressed digital video signal for transmission over a limited bandwidth communication channel to a display, said method comprising the steps of:

(a) providing a frequency transform-encoded digital video signal having encoded frequency coefficients representing a sequence of video frames, wherein the encoding removes temporal redundancies from the video signal and encodes the frequency coefficients as base layer frequency coefficients in a base layer and as residual frequency coefficients in an enhancement layer;

(b) identifying a gaze point of an observer on the display;

(c) partially decoding the encoded digital video signal to recover the frequency coefficients;

(d) adjusting the residual frequency coefficients to reduce the high frequency content of the video signal in regions away from the gaze point;

(e) recoding the frequency coefficients, including the adjusted residual frequency coefficients, to produce a foveated transcoded digital video signal; and

(f) displaying the foveated transcoded digital video signal to the observer.

2. The method according to claim 1, wherein the transform-encoded digital video signal is a stereo video signal and the encoding removes stereo redundancies from the stereo video signal, and wherein the adjusting and recoding steps (d) and (e) are applied to two views.

3. The method according to claim 1, wherein a discrete cosine transform (DCT) is used to generate the frequency coefficients.

4. The method according to claim 3, wherein fine granularity scalability according to the streaming video profile of MPEG 4 is used to generate

the encoded digital video signal.

5. The method according to claim 1, wherein a wavelet transform is used to generate the frequency coefficients.

6. The method according to claim 5, wherein the frequency coefficients are encoded according to the JPEG2000 standard.

7. The method according to claim 1, wherein very low bit-rate video coding based on matching pursuits is used to generate the frequency coefficients.

8. The method according to claim 1, wherein the residual frequency coefficients are adjusted in step (d) according to an eccentricity-dependent model of a contrast threshold function of the human visual system.

9. The method according to claim 8, wherein the eccentricity-dependent model of the contrast threshold function of the human visual system indicates a maximum visually unnoticeable error for each residual frequency coefficient.

10. The method according to claim 8, wherein the eccentricity accounts for possible error in the estimate of the observer's point of gaze.

11. The method according to claim 4, wherein information content of the frequency coefficients is reduced by setting visually insignificant DCT coefficient bitplanes to zero.

12. The method according to claim 4, wherein information content of the frequency coefficients is reduced by discarding visually insignificant DCT coefficient bitplanes.

13. The method according to claim 4, wherein DCT coefficients corresponding to a region of interest at the gaze point are bit-plane shifted by applying visual weights during recoding in step (e) to give priority to these coefficients in the transcoded video signal.

14. The method according to claim 6, wherein information content of the frequency coefficients is reduced by discarding visually insignificant codeblock bitplane coding passes.

15. The method according to claim 6, wherein compressed data corresponding to a region of interest at the gaze point are given priority in the transcoded digital video signal.

16. The method according to claim 7, wherein a dictionary of basis functions is used to encode a prediction residual as a series of atoms, and information content of the frequency coefficients is reduced by discarding or coarsely quantizing visually insignificant atoms.

17. A system for transcoding a frequency transform-encoded digital video signal representing a sequence of video frames to produce a compressed digital video signal for transmission over a limited bandwidth communication channel, said system comprising:

(a) a memory containing an encoded digital video signal representing a sequence of video frames, wherein the encoding removes temporal redundancies from the video sequence and encodes the frequency coefficients as base layer frequency coefficients in a base layer and as residual frequency coefficients in an enhancement layer;

(b) a display for displaying the video signal to an observer;

(c) a gaze tracking device for identifying the observer's gaze point on the display;

(d) a decoding unit for partially decoding the encoded digital video signal to recover the frequency coefficients;

(e) a foveation processing unit for adjusting the residual frequency coefficients to reduce high frequency content of the video signal in regions away from the gaze point;

(f) a transcoding unit for recoding the frequency coefficients, including the adjusted residual frequency coefficients, to produce a foveated transcoded digital video signal; and

(g) means for transmitting and decoding the transcoded digital video signal and providing the decoded digital video signal to the display.

18. The system according to claim 17, wherein the digital video signal is a digital stereo video signal and the encoding also removes stereo redundancies from the digital stereo video signal.

19. The system according to claim 17, wherein the foveation processing unit includes a discrete cosine transform (DCT) for generating the frequency coefficients.

20. The system according to claim 19, wherein fine granularity scalability according to the streaming video profile of MPEG 4 is used to generate the encoded digital video signal.

21. The system according to claim 17, wherein the frequency coefficients are generated according to a wavelet transform .

22. The system according to claim 21, wherein the frequency coefficients are encoded according to the JPEG2000 standard.

23. The system according to claim 17, wherein the frequency coefficients are generated according to very low bit rate video coding based on a technique of matching pursuits.

24. The system according to claim 17, wherein the foveation

processing unit for adjusting the frequency coefficients utilizes an eccentricity-dependent model of a contrast threshold function of the human visual system.

25. The system according to claim 24, wherein the eccentricity-dependent model of the contrast threshold function of the human visual system indicates a maximum visually unnoticeable error for each frequency coefficient.

26. The system according to claim 24, wherein the eccentricity model accounts for possible error in the estimate of the observer's point of gaze.

27. The system according to claim 20, wherein the foveation processing unit reduces information content of the frequency coefficients by setting visually insignificant DCT coefficient bitplanes to zero.

28. The system according to claim 20, wherein the foveation processing unit reduces information content of the frequency coefficients by discarding visually insignificant DCT coefficient bitplanes.

29. The system according to claim 20, wherein DCT coefficients corresponding to a region of interest at the gaze point are bit-plane shifted during transcoding to give priority to these coefficients in the transcoded digital video signal.

30. The system according to claim 22, wherein the foveation processing unit reduces the information content of frequency coefficients by discarding visually insignificant codeblock bitplane coding passes.

31. The system according to claim 22, wherein compressed data corresponding to the region of interest at the gaze point is given priority in the transcoded signal.

32. The system according to claim 23, wherein a dictionary of

basis functions is used to encode a prediction residual as a series of atoms, and wherein the foveation processing unit reduces information content of the frequency coefficients by discarding or coarsely quantizing visually insignificant atoms.